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Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application.

Listing of Claims:

Please amend the claims as follows without prejudice. No new matter has been added by way of these amendments.

We claim:

1. (Currently Amended)A method of generating and recording or displaying a sequence of drill bits, chosen from among a plurality of bit candidates to be used, for drilling an Earth formation in response to input data representing Earth formation characteristics of the formation to be drilled, comprising the steps of:

comparing said input data representing said characteristics of the formation to be drilled with a set of historical data including a plurality of sets of Earth formation characteristics and a corresponding plurality of sequences of drill bits to be used in connection with said sets of Earth formation characteristics, and, using statistical processing, locating a substantial match between said characteristics of the formation to be drilled associated with said input data and at least one of said plurality of sets of Earth formation characteristics associated with said set of historical data, wherein the Earth formation characteristics include rock strength;

when said substantial match is found, generating one of said plurality of sequences of drill bits in response thereto; and

recording or displaying said one of said plurality of sequences of drill bits on a recorder or display device.

2. (Original)The method of claim 1, wherein the comparing step comprises the step of: verifying a hole size and filtering out bit sizes that do not match the hole size.

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3. (Original)The method of claim 1, wherein the comparing step comprises the step of: checking if a bit is not drilling beyond a casing point.

4. (Original)The method of claim 1, wherein the comparing step comprises the step of: checking a cumulative mechanical drilling energy for a bit run and comparing said cumulative mechanical drilling energy with a statistical mechanical drilling energy for said bit, and assigning a proper risk to said bit run.

5. (Original)The method of claim 1, wherein the comparing step comprises the step of: checking cumulative bit revolutions and comparing said cumulative bit revolutions with statistical bit revolutions for a bit type and assigning a proper risk to said bit run.

6. (Original)The method of claim 1, wherein the comparing step comprises the step of: verifying that an encountered rock strength is not outside a range of rock strengths that is optimum for a selected bit type.

7. (Original)The method of claim 1, wherein the comparing step comprises the step of: extending a footage by approximately 25% in the event that a casing point can be reached by a last selected bit.

8. (Original)The method of claim 1, wherein the comparing step comprises the step of: reading variables and bit selection constants and bit selection catalogs and building a cumulative rock strength curve from casing point to casing point using the following equation: 23 CumUCS = start end (UCS) ft

9. (Original)The method of claim 1, wherein the comparing step comprises the step of: determining a required hole size and finding bit candidates that match a closest unconfined compressive strength of a rock to drill.

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10. (Original)The method of claim 1, wherein the comparing step comprises the step of: determining an end depth of a bit by comparing a historical drilling energy with a cumulative rock strength curve for all bit candidates.

11. (Original)The method of claim 1, wherein the comparing step comprises the step of: calculating a cost per foot for each bit candidate taking into account a rig rate, trip speed, and drilling rate of penetration, using the following equation: 24 TOT Cost = (RIG RATE + SPREAD RATE) (T_TripIn + footage ROP + T_Trip) + Bit Cost

12. (Original)The method of claim 1, wherein the comparing step comprises the step of: evaluating which bit candidate is most economic.

13. (Original)The method of claim 1, wherein the comparing step comprises the step of: calculating a remaining cumulative rock strength to casing point.

14. (Original)The method of claim 1, wherein the comparing step comprises the step of: (a) finding bit candidates that match a closest unconfined compressive strength of a rock to drill; (b) determining an end depth of a bit by comparing a historical drilling energy with a cumulative rock strength curve for all bit candidates; (c) calculating a cost per foot for each bit candidate taking into account a rig rate, trip speed, and drilling rate of penetration, using the following equation: 25 TOT Cost = (RIG RATE + SPREAD RATE) (T_TripIn + footage ROP + T_Trip) + Bit Cost ;(d) evaluating which bit candidate is most economic; (e) calculating a remaining cumulative rock strength to casing point; and (f) repeating steps (a) through (e) until an end of a hole section is reached.

15. (Original)The method of claim 1, wherein the comparing step comprises the step of: building a cumulative unconfined compressive strength.

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16. (Original)The method of claim 1, wherein the comparing step comprises the step of: selecting bits, and displaying bit performance and operating parameters.

17. (Original)The method of claim 1, wherein the comparing step comprises the step of: removing sub-optimum drill bits.

18. (Original)The method of claim 1, wherein the comparing step comprises the step of: finding a most economic bit based on cost per foot.

19. (Original)The method of claim 1, wherein said input data is selected from a group consisting of: Measured Depth, Unconfined Compressive Strength, Casing Point Depth, Hole Size, Conductor, Casing Type Name, Casing Point, Day Rate Rig, Spread Rate Rig, and Hole Section Name.

20. (Original)The method of claim 1, wherein the method of generating and recording or displaying a sequence of drill bits chosen from among a plurality of bit candidates to be used comprises the further step of: generating and recording or displaying a set of bit selection output data, where said bit selection output data is selected from a group consisting of: Measured Depth, Cumulative Unconfined Compressive Strength (UCS), Cumulative Excess UCS, Bit Size, Bit Type, Start Depth, End Depth, Hole Section Begin Depth, Average UCS of rock in section, Maximum UCS of bit, BitAverage UCS of rock in section, Footage, Statistical Drilled Footage for the bit, Ratio of footage drilled compared to statistical footage, Statistical Bit Hours, On Bottom Hours, Rate of Penetration (ROP), Statistical Bit Rate of Penetration (ROP), Mechanical drilling energy, Weight On Bit, Revolutions per Minute (RPM), Statistical Bit RPM, Calculated Total Bit Revolutions, Time to Trip, Cumulative Excess as a ration to the Cumulative UCS, Bit Cost, and Hole Section Name.

21. (Currently Amended)A program storage device readable by a machine tangibly embodying a program of instructions executable by the machine to perform method steps for generating and recording or displaying a sequence of drill bits, chosen from among a plurality of bit candidates,

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for drilling an Earth formation in response to input data representing Earth formation characteristics of the formation to be drilled, said method steps comprising:

comparing said input data representing said characteristics of the formation to be drilled with a set of historical data including a plurality of sets of Earth formation characteristics and a corresponding plurality of sequences of drill bits to be used in connection with said sets of Earth formation characteristics, and locating a substantial match, using statistical processing, between said characteristics of the formation to be drilled associated with said input data and at least one of said plurality of sets of Earth formation characteristics associated with said set of historical data, wherein the Earth formation characteristics includes rock strength;

when said substantial match is found, generating one of said plurality of sequences of drill bits in response thereto; and

recording or displaying said one of said plurality of sequences of drill bits on a recorder or display device.

22. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: verifying a hole size and filtering out bit sizes that do not match the hole size.

23. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: checking if a bit is not drilling beyond a casing point.

24. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: checking a cumulative mechanical drilling energy for a bit run and comparing said cumulative mechanical drilling energy with a statistical mechanical drilling energy for said bit, and assigning a proper risk to said bit run.

25. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: checking cumulative bit revolutions and comparing said cumulative bit revolutions with statistical bit revolutions for a bit type and assigning a proper risk to said bit run.

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26. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: verifying that an encountered rock strength is not outside a range of rock strengths that is optimum for a selected bit type.

27. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: extending a footage by approximately 25% in the event that a casing point can be reached by a last selected bit.

28. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: reading variables and bit selection constants and bit selection catalogs and building a cumulative rock strength curve from casing point to casing point using the following equation: 26 CumUCS = start end (UCS) ft

29. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: determining a required hole size and finding bit candidates that match a closest unconfined compressive strength of a rock to drill.

30. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: determining an end depth of a bit by comparing a historical drilling energy with a cumulative rock strength curve for all bit candidates.

31. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: calculating a cost per foot for each bit candidate taking into account a rig rate, trip speed, and drilling rate of penetration, using the following equation: 27 TOT Cost = (RIG RATE + SPREAD RATE) (T_TripIn + footage ROP + T_Trip) + Bit Cost

32. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: evaluating which bit candidate is most economic.

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33. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: calculating a remaining cumulative rock strength to casing point.

34. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: (a) finding bit candidates that match a closest unconfined compressive strength of a rock to drill; (b) determining an end depth of a bit by comparing a historical drilling energy with a cumulative rock strength curve for all bit candidates; (c) calculating a cost per foot for each bit candidate taking into account a rig rate, trip speed, and drilling rate of penetration, using the following equation: 28 TOT Cost = (RIG RATE + SPREAD RATE) (T_TripIn + footage ROP + T_Trip) + Bit Cost ;(d) evaluating which bit candidate is most economic; (e) calculating a remaining cumulative rock strength to casing point; and (f) repeating steps (a) through (e) until an end of a hole section is reached.

35. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: building a cumulative unconfined compressive strength.

36. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: selecting bits, and displaying bit performance and operating parameters.

37. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: removing sub-optimum drill bits.

38. (Original)The program storage device of claim 21, wherein the comparing step comprises the step of: finding a most economic bit based on cost per foot.

39. (Original)The program storage device of claim 21, wherein said input data is selected from a group consisting of: Measured Depth, Unconfined Compressive Strength, Casing Point Depth, Hole Size, Conductor, Casing Type Name, Casing Point, Day Rate Rig, Spread Rate Rig, and

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Hole Section Name.

40. (Original)The program storage device of claim 21, wherein the steps of generating and recording or displaying a sequence of drill bits chosen from among a plurality of bit candidates to be used comprises the further step of: generating and recording or displaying a set of bit selection output data, where said bit selection output data is selected from a group consisting of: Measured Depth, Cumulative Unconfined Compressive Strength (UCS), Cumulative Excess UCS, Bit Size, Bit Type, Start Depth, End Depth, Hole Section Begin Depth, Average UCS of rock in section, Maximum UCS of bit, BitAverage UCS of rock in section, Footage, Statistical Drilled Footage for the bit, Ratio of footage drilled compared to statistical footage, Statistical Bit Hours, On Bottom Hours, Rate of Penetration (ROP), Statistical Bit Rate of Penetration (ROP), Mechanical drilling energy, Weight On Bit, Revolutions per Minute (RPM), Statistical Bit RPM, Calculated Total Bit Revolutions, Time to Trip, Cumulative Excess as a ration to the Cumulative UCS, Bit Cost, and Hole Section Name.

41. (Original)A method of selecting one or more drill bits to drill in an Earth formation, comprising the steps of:

(a) reading variables and constants,

(b) reading catalogs,

(c) building a cumulative rock strength curve from casing point to casing point,

(d) determining a required hole size,

(e) finding the bit candidates that match the closest unconfined compressive strength of a rock to drill,

(f) determining an end depth of a bit by comparing a historical drilling energy with a cumulative rock strength curve for all bit candidates,

(g) calculating a cost per foot for each bit candidate taking into account the rig rate, trip speed and drilling rate of penetration,

(h) evaluating which bit candidate is most economic,

(i) calculating a remaining cumulative rock strength to casing point, and

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(j) repeating steps (e) to (i) until an end of the hole section is reached.

42. (Original)The method of claim 41, further comprising the steps of: (k) building a cumulative rock strength curve (Cum UCS), (l) selecting bits, and displaying bit performance and operating parameters, (m) removing sub-optimum bits, and (n) finding a most economic bit based on cost per foot.

43. (Original)The method of claim 42, wherein the building step (c) for building a cumulative rock strength curve from casing point to casing point uses the following equation: 29 CumUCS = start end (UCS) ft .

44. (Original)The method of claim 43, wherein the calculating step (g) for calculating a cost per foot for each bit candidate taking into account the rig rate, trip speed and drilling rate of penetration uses the following equation: 30 TOT Cost = (RIG RATE + SPREAD RATE) (T_TripIn + footage ROP + T_Trip) + Bit Cost .

45. (Original)A program storage device readable by a machine tangibly embodying a program of instructions executable by the machine to perform method steps for selecting one or more drill bits to drill in an Earth formation, said method steps comprising:

(a) reading variables and constants,

(b) reading catalogs,

(c) building a cumulative rock strength curve from casing point to casing point,

(d) determining a required hole size,

(e) finding the bit candidates that match the closest unconfined compressive strength of a rock to drill,

(f) determining an end depth of a bit by comparing a historical drilling energy with a cumulative rock strength curve for all bit candidates,

(g) calculating a cost per foot for each bit candidate taking into account the rig rate, trip speed and drilling rate of penetration,

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(h) evaluating which bit candidate is most economic,

(i) calculating a remaining cumulative rock strength to casing point, and

(j) repeating steps (e) to (i) until an end of the hole section is reached.

46. (Original) The program storage device of claim 45, further comprising the steps of: (k) building a cumulative rock strength curve (Cum UCS), (l) selecting bits, and displaying bit performance and operating parameters, (m) removing sub-optimum bits, and (n) finding a most economic bit based on cost per foot.

47. (Original) The program storage device of claim 46, wherein the building step (c) for building a cumulative rock strength curve from casing point to casing point uses the following equation: 31 CumUCS = start end (UCS) ft .

48. (Original) The method of claim 47, wherein the calculating step (g) for calculating a cost per foot for each bit candidate taking into account the rig rate, trip speed and drilling rate of penetration uses the following equation: 32 TOT Cost = (RIG RATE + SPREAD RATE) (T_TripIn + footage ROP + T_Trip) + Bit Cost .

49. (Original) A method of selecting a bit to drill an Earth formation, comprising the steps of:

(a) receiving a list of bit candidates and determining an average rock strength for each bit candidate;

(b) determining a resultant cumulative rock strength for said each bit candidate in response to the average rock strength for said each bit candidate;

(c) performing an economic analysis in connection with said each bit candidate to determine if said each bit candidate is an inexpensive bit candidate; and

(d) selecting said each bit candidate to be said bit to drill said Earth formation when said resultant cumulative rock strength is greater than or equal to a predetermined value and said each bit candidate is an inexpensive bit candidate.

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50. (Original) A program storage device readable by a machine tangibly embodying a program of instructions executable by the machine to perform method steps for selecting a bit to drill an Earth formation, said method steps comprising:

(a) receiving a list of bit candidates and determining an average rock strength for each bit candidate;

(b) determining a resultant cumulative rock strength for said each bit candidate in response to the average rock strength for said each bit candidate;

(c) performing an economic analysis in connection with said each bit candidate to determine if said each bit candidate is an inexpensive bit candidate; and

(d) selecting said each bit candidate to be said bit to drill said Earth formation when said resultant cumulative rock strength is greater than or equal to a predetermined value and said each bit candidate is an inexpensive bit candidate.

51. (Original) A system adapted for selecting a bit to drill an Earth formation, comprising:

apparatus adapted for receiving a list of bit candidates and determining an average rock strength for each bit candidate;

apparatus adapted for determining a resultant cumulative rock strength for said each bit candidate in response to the average rock strength for said each bit candidate;

apparatus adapted for performing an economic analysis in connection with said each bit candidate to determine if said each bit candidate is an inexpensive bit candidate; and

apparatus adapted for selecting said each bit candidate to be said bit to drill said Earth formation when said resultant cumulative rock strength is greater than or equal to a predetermined value and said each bit candidate is an inexpensive bit candidate.

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